

# EOS-AM PROJECT

## STATEMENT OF WORK (SOW) FOR THE MODERATE RESOLUTION IMAGING SPECTRORADIOMETER (MODIS) INSTRUMENT

GSFC 422-20-03, JUNE 1, 1990

ASSOCIATED DOCUMENT CHANGE NOTICE(S) (DCNs)

### DISTRIBUTION LIST

Anderson, Ken/421  
Barker, Dr. John/925  
Barnes, Dr. Bill/970  
Becker, Theresa/214.3  
Berry, Rick/422/CM Office  
Congedo, Cherie/721.1  
Daelemans, George/422  
Davis, Mitch/738.1  
Ellis, Jack/421  
Ferragut, Nelson/723.3  
Gorman, Stephanie/421/MODIS DM  
Office  
Graziani, Larissa/421  
Guenther, Dr. Bruce/925

Jones, David/421/SBRS  
Knight, Ed/925  
Martineau, Dr. Bob/718.1  
EOS Project Library/170  
Parkinson, Dr. Claire/422  
Pecori, Pete/422  
Roberto, Mike/421  
Sabatino, Rick/OMITRON  
Safren, Harvey/733.4  
Shears, Lisa/421  
Silva, Bob/421  
Thompson, Les/975  
Waluschka, Dr. Gene/717.4  
Young, Dr. Eric/717

Copies of the above listed document and DCNs are kept in the MTPE/EOS Project Library. Contact Linda Fatahi-Yar at (301) 286-5641 or Janet Wasek at (301) 286-4406, Building 16W, Room N88.

Contact Carol Blank/EOS-AM Project CM Office at (301) 286-5021, Building 16W, Room N70 for deletions or additions to this distribution list.

1619

## DOCUMENT CHANGE NOTICE

1. ORIGINATOR NAME AND ADDRESS Ken Anderson, MODIS Instrument Manager EOS-AM Project, CODE 421 Bldg. 16W, Room N81 NASA/GSFC, Greenbelt, MD (301) 286-6845		2. APPROVED DATE 07/09/97	4. DOCUMENT NO. 422-20-03
		3. CODE IDENT. 421	5. DCN NO. CH-12
6. SYSTEM DESIGNATION MODIS Instrument	7. RELATED CCR NO. 421-12-14-067	8. CONTRACT NO. NAS5-30800	9. CONTRACTUAL ACTIVITY
10. CONFIGURATION ITEM NOMENCLATURE SOW for the MODIS-N		11. EFFECTIVITY	


THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS DCN BEING THOSE FURNISHED HERewith AND CARRYING THE SAME DATE AS THIS DCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES, COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS DOCUMENT.

12. DOCUMENT	13. PAGES CHANGED (INDICATE DELETIONS)	*S	*A	14. DATE
422-20-03	Pages i, ii, 1, 6, and page 7	X		07/09/97

15. TECHNICAL CONCURRENCE	<i>Mike Roberts</i>	7/18/97	DATE
---------------------------	---------------------	---------	------

16/9


## DOCUMENT CHANGE NOTICE

1. ORIGINATOR NAME AND ADDRESS Ken Anderson, MODIS Instrument Manager EOS-AM Project, CODE 421 Bldg. 16W, Room N81 NASA/GSFC, Greenbelt, MD (301) 286-6845		2. APPROVED DATE 10/16/96		4. DOCUMENT NO. 422-20-03	
		3. CODE IDENT. 421		5. DCN NO. CH-11	
6. SYSTEM DESIGNATION MODIS Instrument		7. RELATED CCR NO. 421-12-14-056		8. CONTRACT NO. NAS5-30800	
		9. CONTRACTUAL ACTIVITY			
10. CONFIGURATION ITEM NOMENCLATURE SOW for the MODIS-N		11. EFFECTIVITY			
THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS DCN BEING THOSE FURNISHED HERewith AND CARRYING THE SAME DATE AS THIS DCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES, COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS DOCUMENT.					
12. DOCUMENT	13. PAGES CHANGED (INDICATE DELETIONS)			*S	*A
422-20-03	Pages i, ii, and page 11			X	
					14. DATE
					10/16/96
<div style="border: 1px solid black; border-radius: 15px; padding: 10px; width: fit-content; margin: 20px auto;"> Page 12 was affected by this change due to repagination. </div>					
15. TECHNICAL CONCURRENCE					
					DATE 11/5/96

# DOCUMENT CHANGE NOTICE

<b>1. ORIGINATOR NAME AND ADDRESS</b> Ken Anderson, MODIS Instrument Manager EOS-AM Project/GSFC Bldg. 16W, Room N81 (301) 286-6845		<b>2. APPROVED DATE</b> 10/27/95	<b>4. DOCUMENT NO.</b> 422-20-03		
		<b>3. CODE IDENT.</b> 421	<b>5. DCN NO.</b> CH-10		
<b>6. SYSTEM DESIGNATION</b> MODIS Instrument	<b>7. RELATED CCR NO.</b> 421-12-14-046	<b>8. CONTRACT NO.</b> NAS5-30800	<b>9. CONTRACTUAL ACTIVITY</b>		
<b>10. CONFIGURATION ITEM NOMENCLATURE</b> SOW for the MODIS-N		<b>11. EFFECTIVITY</b>			
THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS DCN BEING THOSE FURNISHED HERewith AND CARRYING THE SAME DATE AS THIS DCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES, COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS DOCUMENT.					
<b>12. DOCUMENT</b>  422-20-03	<b>13. PAGES CHANGED (INDICATE DELETIONS)</b>  Pages i, ii, and page 3  <div style="border: 1px solid black; border-radius: 15px; padding: 10px; margin: 20px auto; width: 80%; text-align: center;"> <b>Page 4 was affected by this change due to repagination.</b> </div>		*S  X	*A	<b>14. DATE</b>  10/27/95
<b>15. TECHNICAL CONCURRENCE</b> <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> </div> <div style="text-align: right;"> <b>DATE</b>                  11/2/95             </div> </div>					

# DOCUMENT CHANGE NOTICE

<b>1. ORIGINATOR NAME AND ADDRESS</b> Ken Anderson, MODIS Instrument Manager EOS-AM Project/GSFC Bldg. 16W, Room N81 (301) 286-6845		<b>2. APPROVED DATE</b> 01/30/95	<b>4. DOCUMENT NO.</b> 422-20-03		
		<b>3. CODE IDENT.</b> 421	<b>5. DCN NO.</b> CH-09		
<b>6. SYSTEM DESIGNATION</b> MODIS Instrument	<b>7. RELATED CCR NO.</b> 421-12-14-036	<b>8. CONTRACT NO.</b> NAS5-30800	<b>9. CONTRACTUAL ACTIVITY</b>		
<b>10. CONFIGURATION ITEM NOMENCLATURE</b> SOW for the MODIS-N		<b>11. EFFECTIVITY</b>			
THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS DCN BEING THOSE FURNISHED HERewith AND CARRYING THE SAME DATE AS THIS DCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES, COMBINED WITH NON-LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4, CONSTITUTE THE CURRENT VERSION OF THIS DOCUMENT.					
<b>12. DOCUMENT</b>	<b>13. PAGES CHANGED (INDICATE DELETIONS)</b>		<b>*S</b>	<b>*A</b>	<b>14. DATE</b>
422-20-03	Pages i, ii, and page 10		X		01/30/95
<b>15. TECHNICAL CONCURRENCE</b> 					<b>DATE</b> 2/2/95

**CHANGE RECORD PAGE**

DOCUMENT TITLE: Statement of Work (SOW) for the MODIS Instrument			
DOCUMENT DATE: June 1, 1990			
ISSUE	DATE	PAGES AFFECTED	DESCRIPTION
Baseline	06/01/90	All	
CH-01	10/24/91	Pages 9 & 10	Approved by CCR 422-21-001
CH-02	07/14/92	Page 4	Approved by CCR 421-12-04-007
CH-03	08/14/92	Pages 3 & 11	Approved by CCR 421-12-04-011
CH-04	01/06/93	Page 6	Approved by CCR 421-12-04-022
CH-05	05/06/93	Page 5	Approved by CCR 421-12-14-006
CH-06	07/29/93	Pages 3 & 4	Approved by CCR 421-12-14-013
CH-06A	10/04/93	Pages 3 & 4	Approved by CCR 421-12-14-013-R1
CH-07	05/26/94	Pages i, ii, 1, 5 & 6	Approved by CCR 421-12-14-024-R1
CH-08	05/26/94	Pages i, ii, 5 & 6	Approved by CCR 421-12-14-015-R2
CH-06B	06/30/94	Pages i, ii, & 3	Approved by CCR 421-12-14-013-R2
CH-09	01/30/95	Pages i, ii, & 10	Approved by CCR 421-12-14-036
CH-10	10/27/95	Pages i, ii, & 3	Approved by CCR 421-12-14-046
CH-11	10/16/96	Pages i, ii, & 11	Approved by CCR 421-12-14-056
CH-12	07/09/97	Pages i, ii, 1, 6, & 7	Approved by CCR 421-12-14-067

EOS 420-CM-05 (4/92)



Statement of Work  
Moderate-Resolution Imaging Spectrometer-Nadir (MODIS-N)  
Document 422-20-03

I. SCOPE

A. In accordance with the requirements of the MODIS-N Specification 422-20-02, the contractor shall provide the personnel, materials, equipment, and facilities necessary for design, analysis, development, fabrication, assembly, testing, calibration, qualification, acceptance, storage, storage testing, and support for Spacecraft (S/C) integration and launch, of MODIS-N instrument models. Various analytical models and test models are required. The effort includes ground support equipment with computer systems and test and calibration equipment. The effort includes a system study, delivery, storage, post-delivery bench testing, engineering data analyses, spacecraft integration support, pre-launch support and post-launch support. Reporting, reviews and documentation of all aspects of the program are required. The operating MODIS-N instrument units include the Engineering Model, Protoflight Model, and Flight Model 1. The three contract options are for one flight model each.

| CH-12

B. MODIS-N is planned for flights beginning with the first Earth Observing System (EOS) Polar Platform. MODIS-N shall be compatible with the EOS spacecraft interfaces and shall meet the lifetime requirement without in-orbit servicing.

II. REQUIREMENTS

A. The MODIS-N requirements are defined in this Statement of Work (SOW) and in the MODIS-N Specification 422-20-02, including documents imposed therein. The order of precedence is this SOW, the MODIS-N Specification 422-20-02, then other applicable documents. The Level 2 organization of the Work Breakdown Structure, 422-20-01, corresponds to the organization of this SOW.

0. System Study

A. The contractor shall conduct a System Study to refine his derived requirements and work plans for satisfying Specification 422-20-02, to further analyze the instrument design, to perform tradeoffs, and to further determine system margins for instrument requirements such as sensitivity,



polarization, stability, and calibration. This effort shall include a Project Initiation Meeting early in the program. The effort shall include the development and further definition of the contractor's Work Breakdown Structure, schedules and work packages, and lead to a System Study Review.

## 1. Program Management

A. The contractor shall maintain a project office which provides technical and resource management of the project. This office shall be directed by a dedicated project manager. This office shall provide administrative and technical direction, schedule control and reporting, financial control and reporting, subcontract management, configuration management and documentation, progress reports, preparation and support of all reviews, documentation, generation of minutes of meetings/reviews, and implementation of the Performance Measurement System (PMS) in accordance with GSFC Handbook GHB 5112.1. This office shall be the principal interface between the contractor and the GSFC EOS Project, and its MODIS-N Instrument Manager. It shall report to a level of company management appropriate to insure prompt resolution of all problems. This office shall be responsible for compliance with the reportable items set forth in the Contract Documentation Requirements List 422-20-06. Section III describes the required reviews and meetings.

## 2. System Engineering

A. The contractor shall provide the personnel and facilities necessary for the system engineering effort, which shall encompass all aspects of instrument performance, testing (unless specifically excluded, testing includes calibration) and evaluation. This activity includes system and subsystem requirements definition, test and calibration requirements definition, and generation or review of various plans and procedures. It includes end-to-end test data system requirements definition from within the instrument to the GSE, via the spacecraft (when present) and EOS Data and Information System (EOSDIS, when present), as well as from within the instrument to a recording medium for subsequent distribution to EOSDIS. It includes instrument integration and testing support, test data analyses, generation of reports and specifications, control of internal instrument interfaces, and control of the instrument side of interfaces to the spacecraft. It includes generation of other technical reports, response to action items from design reviews, reissued reports, contractor internal technical memoranda, and support of storage testing.

B. The system engineering effort shall also address all considerations necessary to meet the Specification 422-20-02, including optical, electrical,

structural, mechanical, thermal, calibration, and data subsystems, as well as interfaces within the instrument and between the instrument and the spacecraft. This effort includes performing analyses, generating overall (top-level) system and subsystem error budgets, and coordination with the system analysis activities. It includes maintaining updated error budgets as well as mass, power, and weight budgets and margins. It includes preparing the MODIS-N Instrument Description Document (IDD) and providing inputs to the observatory integrator to prepare the MODIS-N Interface Control Documents (ICDs) for two unique spacecraft designs, and the review and refinement of the IDD and ICDs at stages during the instrument development program. It includes reporting the status and progress of the system engineering work. This effort also includes evaluating the impact on the instrument design of potential changes in the instrument requirements, external environment, or spacecraft design. Such changes include, but are not limited to, potential changes in band center wavelengths or bandwidths; changes in signal to noise requirements; changes to design margins of safety; changes in type of launch vehicle or launch vehicle environment; significant changes in spacecraft to instrument interface, including reduction in capability of that interface; and changes in orbital thermal, particulate or radiation environments. Any such requests for impact evaluations shall be made in writing by the Contracting Officer, and the contractor shall provide within ten working days a written estimate of the effort required to complete the evaluation. This effort shall be terminated with the delivery of FM1.

CH-10

CH-06B

C. The systems engineering effort also includes evaluating the impact of the EOS-PM spacecraft design accommodations and interfaces on the MODIS instrument and GSE design. In particular, this effort includes supporting two (2) technical interface meetings to evaluate the changes to MODIS which may be required in order to accommodate the instrument on the EOS-PM spacecraft.

D. Ground truth data will be used to verify the specified radiometric calibration accuracy. The ground truth data will be generated by the Instrument Science Team and will be in the form of the radiance at the top of the atmosphere seen by the MODIS-N instrument. The contractor shall develop requirements for the knowledge precision of the ground truth radiance and shall insure that all pertinent instrument physical parameters are measured with sufficient accuracy to enable the ground truth exercise to improve/verify the pre-launch ground calibration.

CH-03

E. The contractor shall provide the personnel and facilities necessary to develop the required test documentation (pre- and post-test) and to perform the required performance, calibration and final acceptance test

of the protoflight and flight models.

| CH-03

### 3. System Analysis

A. In coordination with the system engineering activities, the contractor shall perform analyses in visible and IR instrument radiometry, optics, polarization, stray light, electronics, structure, thermal system, contamination, and optical/electrical/radiometric sensitivity to temperature changes.

B. Algorithms necessary to support all instrument testing, calibration, and performance evaluation shall be developed.

C. Analyses performed by the contractor in order to develop an instrument which meets Specification 422-20-02 shall be delivered, including structural math models, thermal math models, and a radiometric math model. Reduced node structural and thermal math models are required by the General Instrument Interface Specification, 420-03-02, for the EOS Observatory.

### 4. Instrument Design and Development

A. The contractor shall provide the personnel and facilities necessary for the design effort, which shall include the optical, electrical, structural, mechanical, thermal, and safety & reliability design of the instrument, the instrument-to-spacecraft interface design, and for instrument calibration.

B. The contractor shall provide all the instrument software and firmware and associated documentation necessary to operate, calibrate and test the instrument in accordance with the Specification 422-20-02. The contractor shall provide an instrument command list and description, as well as general instrument operating procedures.

C. The contractor shall provide the personnel and facilities necessary for the general program support activities including, but not necessarily limited to, material and processing engineering, sustaining engineering for system fabrication, integration and test, production engineering, visible and IR instrument radiometry and calibration data analysis, software/firmware maintenance and evolution, and any other support activities carried under this segment of the Work Breakdown Structure.

D. Color photographs shall be provided of major components, subsystems, and the system. Pictures of major Ground Support Equipment shall also be provided.

## 5. Test Models and Test Components

A. The contractor shall provide the personnel and facilities necessary for the design, fabrication and testing of models and components which are necessary to verify that the design meets the Specification 422-20-02, or to facilitate the integration of the instrument with the spacecraft. Test models include the Structural Model, and any other physical models necessary for design development and verification.

CH-02

## 6. Engineering Model Fabrication, Assembly, Test, and Calibration

A. The engineering model is defined in Specification 422-20-02; it is the first fully operational unit. It shall remain intact to be available at later dates for comparison/troubleshooting other units, or for other purposes. With the consent of the Government, selected hardware from the engineering model may be reused for subsequent flight units.

CH-07

B. The contractor shall provide the personnel, materials, and facilities necessary to accomplish the following tasks:

- (a) Procure or fabricate all required parts, components, and subassemblies.
- (b) Perform all required subsystem-level alignment, functional, performance, calibration, and development tests.
- (c) Perform the systems assembly and integration.
- (d) Perform all required system-level alignment, development tests necessary to demonstrate the validity of the design. Provide digital data records of all recorded instrument output, and specification compliance and calibration data books.
- (e) Perform the required final acceptance test of the engineering model.
- (f) Prepare the required test documentation (pre- and post-test).
- (g) DELETED
- (h) In the event of any uncorrected deficiencies in the Engineering Model which the Government agrees to accept, a detailed plan shall be prepared for eliminating such deficiencies in the Protoflight Model.
- (i) Perform interface testing using Spacecraft Interface Simulator (SIS).

CH-05

CH-08

## 7. Protoflight Model Fabrication, Assembly, Test, and Calibration

A. The Protoflight Model is defined in Specification 422-20-02; it is planned for flight on the first EOS platform.

B. The contractor shall provide the personnel, materials and facilities necessary to accomplish the following tasks:

- (a) Procure or fabricate all required parts, components, and subassemblies. Perform refurbishment, as appropriate, of any components, subsystems or subassemblies reused from the engineering model.
- (b) Perform all required subsystem-level alignment, functional, performance, calibration, and qualification tests.
- (c) Perform the systems assembly and integration.
- (d) Perform all required system-level alignment, functional, performance, calibration, and qualification tests necessary to demonstrate full compliance with the Specification 422-20-02. Provide digital data records of all recorded instrument output.
- (e) Perform the required preliminary and final acceptance testing of the protoflight model.
- (f) Prepare the required test documentation (pre- and post-test).
- (g) Perform interface testing using the Spacecraft Interface Simulator (SIS).

CH-07

CH-08

## 8. Flight Model 1, Plus Optional Flight Models 3, 4, and 5 Fabrication, Assembly, Test, and Calibration

CH-12

A. A Flight Model is defined in Specification 422-20-02 the Flight Models are scheduled for flight on subsequent spacecraft.

B. Storage and storage testing consists of all facilities, equipment, materials and activities necessary to maintain a Flight Model in a condition to meet Specification 422-20-02 prior to and following launch.

C. The contractor shall provide the personnel, materials, and facilities necessary to accomplish the following tasks:

- (a) Procure or fabricate all required parts, components, and subassemblies. Perform refurbishment, as appropriate, of any components, subsystems or subassemblies reused from the engineering model. | CH-07
- (b) Perform all required subsystem-level alignment, functional, performance, calibration, and acceptance tests.
- (c) Perform the systems assembly and integration.
- (d) Perform all required system-level alignment, functional, performance, calibration, and acceptance tests necessary to demonstrate full compliance with the Specification 422-20-02. Provide digital data records of all recorded instrument output.
- (e) Perform the required preliminary and final acceptance testing of the flight model(s).
- (f) Store Flight Model 1, and perform scheduled storage testing. This does not apply to any optional models. | CH-12
- (g) Perform required post-storage/pre-integration test of FM1. | CH-12
- (h) Prepare the required test documentation (pre- and post-test).

## 9. Ground Support Equipment

A. The contractor shall provide the personnel, materials, and facilities necessary to define detailed Ground Support Equipment (GSE) hardware and software requirements necessary to satisfy the Specification 422-20-02. The contractor shall design, provide, document, and maintain all GSE hardware, software, and firmware, including sustaining engineering for hardware, software, and firmware maintenance and evolution. The GSE includes the System Test Equipment (STE), all GSE software, calibration equipment, test chamber and ambient test equipment, image processors and reproducers, expendable materials, shipping containers, and other necessary supporting equipment and fixturing. | CH-04

B. The contractor shall identify and procure equipment and fixturing available commercially. Where no commercial equipment is adequate the contractor shall design and fabricate or procure special test equipment and fixturing. The contractor shall checkout and maintain all GSE hardware and software. The calibration equipment and software shall be under configuration control.

C. The contractor shall provide the personnel and facilities necessary to prepare and pack the instrument for shipment, and shall arrange said shipment to the spacecraft

contractor's facility.

D. A subset of MODIS-N GSE, including one STE, shall be shipped to the spacecraft contractor's facility for integration and test. It will follow the spacecraft to Western Space and Missiles Center (WSMC) for pre-launch activities, be used at a yet undefined location for the three months of post-launch evaluation, then be returned to the spacecraft contractor's facility for the next platform.

E. The contractor shall provide the necessary modernization to any test equipment or fixturing, when required, which long term maintenance or obsolescence might require.

#### 10. Spares

A. The contractor shall define and implement the spares program necessary to minimize schedule impact created by failures, by contamination, or by other plausible events or conditions. In defining the spares program, the contractor shall consider the reliability, handling, and environment of subsystems, components, and parts, hence the likelihood that these items would need to be replaced. The spares, in quantities to be defined by the contractor, shall be qualified, tested and calibrated as appropriate.

B. The spares shall be available immediately for replacing portions of the instrument to minimize schedule slips of the EM, PFM, and FM's, including optional FM's if the option is exercised. Some spares may remain at the MODIS-N contractor's facility, and some may be sent to the spacecraft contractor's facility. Any remaining spares at the conclusion of the contract shall be shipped to NASA GSFC.

#### 11. Product Assurance

A. The contractor shall maintain a Product Assurance function to carry out the requirements established in the EOS Performance Assurance Requirements Document, 420-05-01. This function shall have sufficient staff and facilities to provide the required reliability engineering, parts engineering, quality assurance engineering, system safety, and materials control for the fabrication, integration, acceptance testing, and calibration of the prototype and flight units. This function shall also support the necessary bonded storage activities.

#### 12. Field Support

A. The contractor shall provide personnel, equipment, and materials for instrument test, spacecraft integration and test support, pre-launch support, launch support, post-launch support, software support, and data

analyses. This support includes operation of all MODIS-N GSE developed under this contract. This support shall take place at the spacecraft integration contractor's facility, at the WSMC, and at Goddard Space Flight Center.

B. The contractor shall perform the initial test of each instrument at the spacecraft integration contractor's facility. The contractor shall provide field support at the spacecraft integration contractor's facility for integration and test of the MODIS-N on the EOS polar platform. This support includes cross-calibrations of MODIS-N with other EOS instruments on the spacecraft. The contractor shall perform analysis of initial orbital data in order to determine instrument in-orbit performance. The contractor shall pack and arrange for shipment of all test equipment being returned to his facility.

C. The field support dates shall correspond to the launch readiness dates.

### III. REVIEWS and MEETINGS

#### A. Project Initiation Meeting

This meeting shall serve to review and discuss the contractor's program plans. It shall be held at the Contractor's Facility (CF).

#### B. System Study Review

This review shall describe in depth the contractor's design, including analyses conducted, rationale for tradeoffs made, system margins for requirements including sensitivity, polarization insensitivity, stability and calibration, and plans for further work leading to the Preliminary Design Review. This review shall include a System Software Concept & Requirements Review. This review shall be at GSFC.

#### C. Program Management Reviews

These reviews shall serve as a forum to track the progress of the program. They shall be held alternately at GSFC and at the Contractor's Facility.

#### D. PMS Compliance Review

The purpose of this review is to allow the GSFC team to evaluate the contractor's management system in operation for compliance with the criteria. The review will also demonstrate the use and understanding of the system by all levels of management. It shall be held at the Contractor's Facility. Follow-up reviews may be required to assess actions taken to correct deficiencies.



E. Software Preliminary Design Review

This review is described in the MODIS-N CDRL. It shall be held at the CF.

F. Preliminary Design Review

This review shall cover the initial Phase-C/D design activity, by which time all fundamental design issues shall have been resolved. It shall be held at the CF.

G. Calibration Peer Review 1

This review shall provide the contractor's detailed calibration scenario to MODIS team scientists and to the Government, including descriptions of planned calibration equipment and facilities. It shall address calibration accuracies. It shall be held near the time of the PDR, at the contractor's facility.

| CH-01

H. Software Critical Design Review

This review is defined in the MODIS-N CDRL. It shall be held at the CF.

I. Critical Design Review

This review shall cover the final design just before substantial flight quality procurement activity by the contractor begins. It shall also review test results from breadboards, test components, available test models, and engineering model. The review shall be held at the CF.

J. Calibration Peer Review 2

This review shall be an update to the first calibration peer review. It shall include a top-level discussion of calibration management and procedures, as well as a detailed update on calibration sources and accuracies. It shall be held near the time of the CDR, at the CF.

K. Software Readiness Review

This review is defined in the MODIS-N CDRL and shall be held at the CF.

| CH-09

L. Engineering Model Test Review

This review shall present as a minimum, all test model, test components, and Engineering Model system and subsystem functional test and calibration results, and a comparison of measured performance with requirements. In addition, the review shall address malfunctions, completeness of drawings, problems and proposed solutions. Further, the

review shall present the status of performance assurance and configuration management activities, spacecraft interface, and schedule. It shall be held at the CF.

M. Calibration Peer Review 3

This review shall be an update to the previous calibration peer reviews. It shall include reporting on the experience of the calibration of the Engineering Model. It shall address EM calibration accuracies achieved, with justification for these claimed accuracies, and plans for improvement if necessary, to meet calibration specifications for calibration of the subsequent MODIS-N Models. It shall be held near the time of the EM Test Review, at the CF.

N. Software Acceptance Review

This review is defined in the MODIS-N CDRL. It shall be held at the CF.

O. Pre-Environmental Review

Prior to subjecting a Protoflight Model or Flight Model to environmental testing, a formal review shall be conducted to determine readiness for the testing. It shall be held at the CF.

P. RESERVED/DELETED

| CH-11

Q. Pre-Storage Review

This review shall be held at the completion of environmental and acceptance tests and prior to storage of the flight models. It shall be conducted in accordance with requirements for a preshipment review. Items which shall be considered in this review are results of system testing and calibration, malfunction reports, completeness of drawing package, reliability predictions, compatibility of performance with requirements, problems and solutions, data package to be provided with instrument, and waivers, if any. The Pre-Storage Review shall conform to the requirements of a Preshipment Review. The review shall be held at the CF.

R. Preshipment Review

This review shall be held at the completion of environmental and acceptance tests of the protoflight and at the end of storage and storage testing of the flight models. Items which shall be considered in this review are results of system testing and calibration, malfunction reports, completeness of drawing package, reliability predictions, compatibility of performance with requirements, problems and solutions, data package to be shipped with instrument, and waivers, if any. It shall be held at the CF.

### S. EOS-PM Interface Meetings

Two (2) meetings shall be held to discuss and evaluate the impact of EOS-PM design and interface changes on the MODIS instrument. As part of these meetings, discussions will be held concerning the impact on MODIS of the EOS-PM interface described in the General Instrument Requirements Document (GIRD). Both reviews shall be held prior to the instrument CDR at GSFC (see III.I).

CH-03